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EXAMINER

MRUK, GEOFFREY S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 04/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/822,956

Applicant(s)

HOWARD, PETER GUY

Examiner

Geoffrey Mruk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 13 April 2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group II, claims 10-25 in the reply filed on 4 April 2006 is acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10, 11, 14-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Lange (US 4,312,009).

With respect to claim 10, Lange discloses a printhead (Column 1, lines 9-12), comprising:

- a laser system (Fig. 11, element 51) operative to emit laser energy (Fig. 11, element 33; Column 6, lines 57-65);
- a page-wide array (Column 8, lines 18-24, i.e. no relative movement of the printing device and printing medium) comprising a plurality of areas (Fig. 11, array of elements 3, 4, 32), each area includes a heating layer (Fig. 11, elements 29, 30) and a plurality of nozzle systems (Fig. 11, array of element 4), the heating layer includes an electric heating layer (Fig. 11, element 29) and a

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photon absorbing layer (Fig. 11, element 30), each heating component of a particular area overlaps the adjacent area, each nozzle system includes:

- an orifice (Fig. 11, element 4), a fluid chamber (Fig. 11, element 3), and the photon absorbing layer (Fig. 11, element 30), the fluid chamber includes a fluid (Column 6, line 40), a portion of the electric heating layer is adjacent the fluid chamber and is operative to heat the fluid in the fluid chamber to the lower threshold temperature (Column 6, lines 41-44), the photon absorbing layer is adjacent the fluid chamber, the photon absorbing layer is operative to absorb laser energy emitted from the laser and heat the fluid in the fluid chamber from the lower threshold temperature to the upper threshold temperature (Column 6, lines 32-41).

With respect to claim 11, Lange discloses a fluid ejection system (Fig. 11) is operative to control the activation of the electric heating layers (Fig. 11, elements 29, 30) in a sequential manner (Column 6, lines 57) from the first end of the page-wide array to the second end of the page-wide array, wherein the fluid ejection system is operative to control the scan rate of the laser system (Fig. 11, element 51) from the first end of the page-wide array to the second end of the page-wide array (Column 6, lines 57-61), wherein the page-wide array printing system synchronizes the activation of the electric heating layers and the scan rate of the laser system from the first end to the second end so that the fluid in the fluid chamber of a selected nozzle system is heated to the lower threshold temperature (Column 6, lines 41-44) using the electric heating

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layer prior to the laser emitting laser energy directed to the photon absorbing layer of the selected nozzle systems (Column 6, lines 32-41).

With respect to claim 14, Lange discloses the electric heating layer includes a resistive layer (Column 11, lines 20-22).

With respect to claim 15, Lange discloses a printhead comprising:

- a fluid chamber (Fig. 11, element 3);
- a nozzle (Fig. 11, element 4) in fluid communication with the fluid chamber to allow the fluid to be ejected from the fluid chamber;
- means (Fig. 11, element 52), responsive to an electric current (Fig. 11, element 29), for heating the fluid in the fluid chamber to a first threshold (Column 6, lines 41-44); and
- means (Fig. 11, element 51), responsive to optical energy (Fig. 11, element 30), for heating the fluid in the fluid chamber to a second threshold sufficient to eject ink from the fluid chamber (Column 6, lines 32-41).

With respect to claim 16, Lange discloses a plurality of fluid chambers and a plurality of nozzles associated with each fluid chamber (Fig. 11, array of elements 3, 4), wherein the means responsive to the electric current heats the fluid in the plurality of fluid chambers and the means responsive to optical energy is operative to heat fluid at each nozzle (Column 6, lines 15-61).

With respect to claim 17, Lange discloses means for synchronizing the heating of the fluid in the fluid chambers to the lower threshold with the heating of the fluid from the lower threshold to the upper threshold (Column 6, lines 32-41).

With respect to claim 18, Lange discloses means for synchronizing the heating of the fluid in each fluid chamber in a sequential manner using the means responsive to the electric current (Fig. 11, element 52) with the heating of the fluid in each nozzle using the means responsive to the optical energy (Fig. 11, element 51; Column 6, lines 57-61, i.e. moving mirrors).

With respect to claim 19, Lange discloses a printhead (Column 1, lines 9-12) comprising:

- a plurality of fluid chambers (Fig. 11, element 3);
- a plurality of nozzles (Fig. 11, element 4), each associated with at least one of the plurality of fluid chambers;
- a plurality of resistors (Fig. 11, elements 1, 29), each coupled to receive electric current (Fig. 11, element 52) and corresponding to one of the plurality of fluid chambers; and
- a plurality photon absorbing layers (Fig. 11, element 30) that generate heat in response to optical energy, each photon absorbing layer being coupled to the fluid chambers to eject fluid from the fluid chambers (Column 6, lines 32-41).

With respect to claim 20, Lange discloses the photon absorbing layer (Fig. 11, element 30) includes a plurality of sections each associated with a single nozzle.

With respect to claim 21, Lange discloses a laser system (Fig. 11, elements 33, 51) operative to direct laser energy at each of the plurality of photon absorbing layers (Column 6, lines 54-61).

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With respect to claim 22, Lange discloses a print control system operative to synchronize the activation of the electric heating layers and the scan rate of the laser system to eject fluid from the fluid chambers (Column 6, lines 54-57, i.e. current pulses and period).

With respect to claim 23, Lange discloses the plurality of resistors and plurality photon absorbing layers are substantially coplanar with each other (Fig. 11, elements 29, 30).

With respect to claim 24, Lange discloses the plurality of resistors and plurality photon absorbing layers each form distinct layers (Fig. 11, elements 29, 30).

With respect to claim 25, Lange discloses the plurality of resistors (Fig. 12, elements 29, 35) are each adjacent to one of the plurality of fluid chambers (Fig. 12, element 3) and wherein the plurality of photon absorbing layers (Fig. 12, element 30) are separated from the fluid ejection chambers by the plurality of resistors.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lange (US 4,312,009) in view of Saito (US 6,068,363).

With respect to claims 12 and 13, Lange discloses the page-wide array (Column 8, lines 18-24, i.e. no relative movement of the printing device and printing medium) and the fluid (Column 6, line 40).

However, Lange fails to disclose the page-wide array includes about 2000 to 8000 nozzle systems and the fluid includes black ink.

Saito discloses a recording head where "in the case of using a line head comprised of nozzles arrayed the full width of A4 size recording paper as the head 30, approximately 3,000 or more become necessary" (Column 2, lines 27-30) and "black ink" (Column 12, line 9).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to use the teachings of Saito for the device disclosed by Lange. The motivation for doing so would have been "Consequently higher image quality, prevention of density irregularities, and improvement of operation reliability can be achieved as compared to using known line heads" (Column 3, lines 45-48).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Matsuda et al. (US 5,521,140) discloses a recording device where "a heater 16 comprising an electric resistor attached to the glass bottom plate 14; vaporizing portions 17 each provided for each of the liquefied dye 22 introduced from each of the liquefied dye reservoir 15; and a semiconductor laser chip (laser light source) 18 and a condenser lens 19 provided to the head base 14 using a support disk

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(not shown in the figure) to irradiate a laser beam L to each of the vaporizing portions 17" (Column 7, lines 50-58).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GSM
4/25/2006


STEPHEN MEIER
SUPERVISORY PATENT EXAMINER

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